

State of the River Report for the Lower St. Johns River Basin *Water Quality, Fisheries, Aquatic Life, Contaminants* 2016



Lower Basin of the St. Johns River Jacksonville, FL

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About the Report

- Funded by COJ EPB
- Purpose
 - Inform the public about the LSJRB health
 - Provide independent assessments of status and trends
- First annual report in 2008
- Authors

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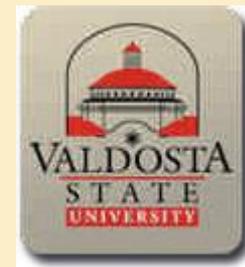
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About the Report

- Reviewers and Advisors:

- SJRWMD
- City of Jacksonville
- FL Dept. of Health
- FDEP
- JEA
- St. Johns Riverkeeper
- Middlebrook Company
- The Nature Conservancy
- FWRI
- FL Sea Grant
- National Park Service
- Wildwood Consulting
- UNF
- JU
- Valdosta State

- Special thanks to:

- Dr. Stuart Chalk
- Dr. Lucy Sonnenberg
- Dr. Dan McCarthy
- Ms. Heather McCarthy
- Dr. Pat Welsh
- Ms. April Moore
- Dr. Ray Bowman
- Dr. Quinton White

About the Report

SJRreport.com

- New interactive website – searchable by COJ council district and planning district
- Topics
 - Background
 - Water Quality
 - Fisheries
 - Aquatic Life
 - Contaminants
- Full Report
- Appendices
- Digital archive of references
- Brochure

Website

http://www.sjrreport.com/dww/

State of the River Report for the Lower St. Johns River Basin

HOME BACKGROUND INDICATORS TRIBUTARIES ABOUT REPORT TOOLS

Water Quality, Fisheries, Aquatic Life, & Contaminants

HOME

RATINGS

EXECUTIVE SUMMARY

HIGHLIGHT-SURVEY RESEARCH ON SJR

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http://www.sjrreport.com/dww/

HOME

Welcome to the Lower St. Johns River Basin “State of the River” Report.

The State of the River Report is the result of a collaborative effort of a team of academic researchers from Jacksonville University, the University of North Florida and Valdosta State University. The purpose of the project, funded primarily by the Environmental Protection Board of the City of Jacksonville, was to review various previously collected data and literature about the river and to place it into a format that was informative and readable to the general public. The report consisted of three parts—the brochure, the full report, and an appendix. The short brochure provides a brief summary of the status and trends of each item or indicator (i.e. water quality, fisheries, etc.) looked at for the river. The full report and appendix were produced to provide those interested with more detail regarding the results summarized in the brochure. In the development of these documents, many different sources of data were examined, including data from the Florida Department of Environmental Protection, St. Johns River Water Management District, Fish and Wildlife Commission, City of Jacksonville, individual researchers, and others.

Water Quality

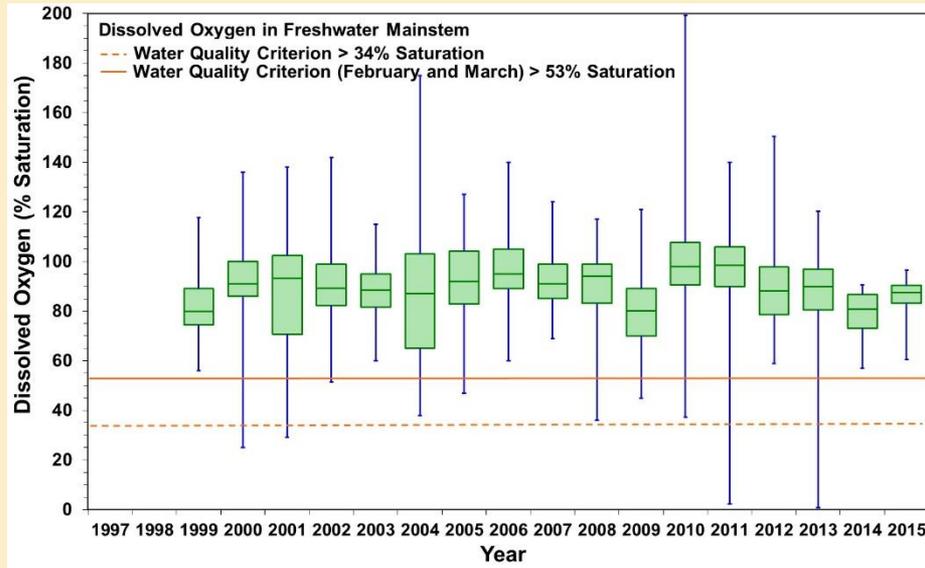
Indicator	Status	Trends
Salinity	Unsatisfactory	Worsening
Fecal Coliform	Unsatisfactory	Unchanged
Turbidity	Satisfactory	Unchanged
Dissolved Oxygen	Mainstem: Satisfactory Tributaries: Unsatisfactory	Mainstem: Unchanged Tributaries: Unchanged
Algal Blooms	Unsatisfactory	Unchanged
Nitrogen	Mainstem: Unsatisfactory Tributaries: Unsatisfactory	Mainstem: Improving Tributaries: Unchanged
Phosphorus	Mainstem: Satisfactory Tributaries: Unsatisfactory	Mainstem: Unchanged Tributaries: Unchanged

Fecal Coliform

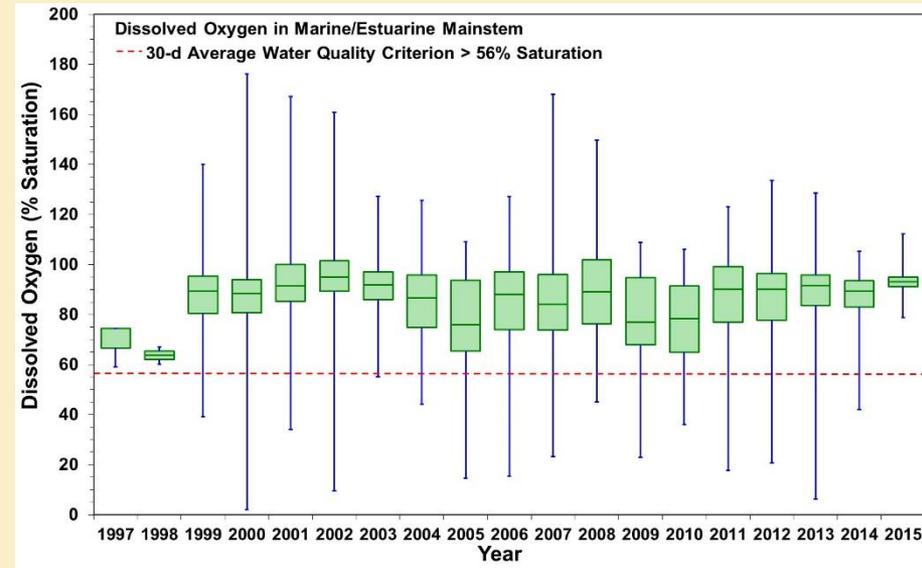
- LSJRB tributaries impaired for fecal coliform: 75 total as of 2014. Of those, 25 have final BMAPs.
- New methodology for assessing them involves calculating frequency of exceedances above 400 CFU/100 mL. Frequency of exceedances should not exceed 10% of measurements.
- As of 2015, no tributary has reached the goal of 10% maximum percent exceedances.
 - Lowest: Lower Trout River (21%), Pottsburg Creek (28%)
 - Sherman, Hopkins, Greenfield Creeks and the Middle Trout River have percentage exceedances between 30 and 49%.
 - For the rest of the BMAP tributaries, 50% or more of all samples exceed the WQC, to a high of 93% of all measurements in Craig Creek.

Dissolved Oxygen - Mainstem

Freshwater

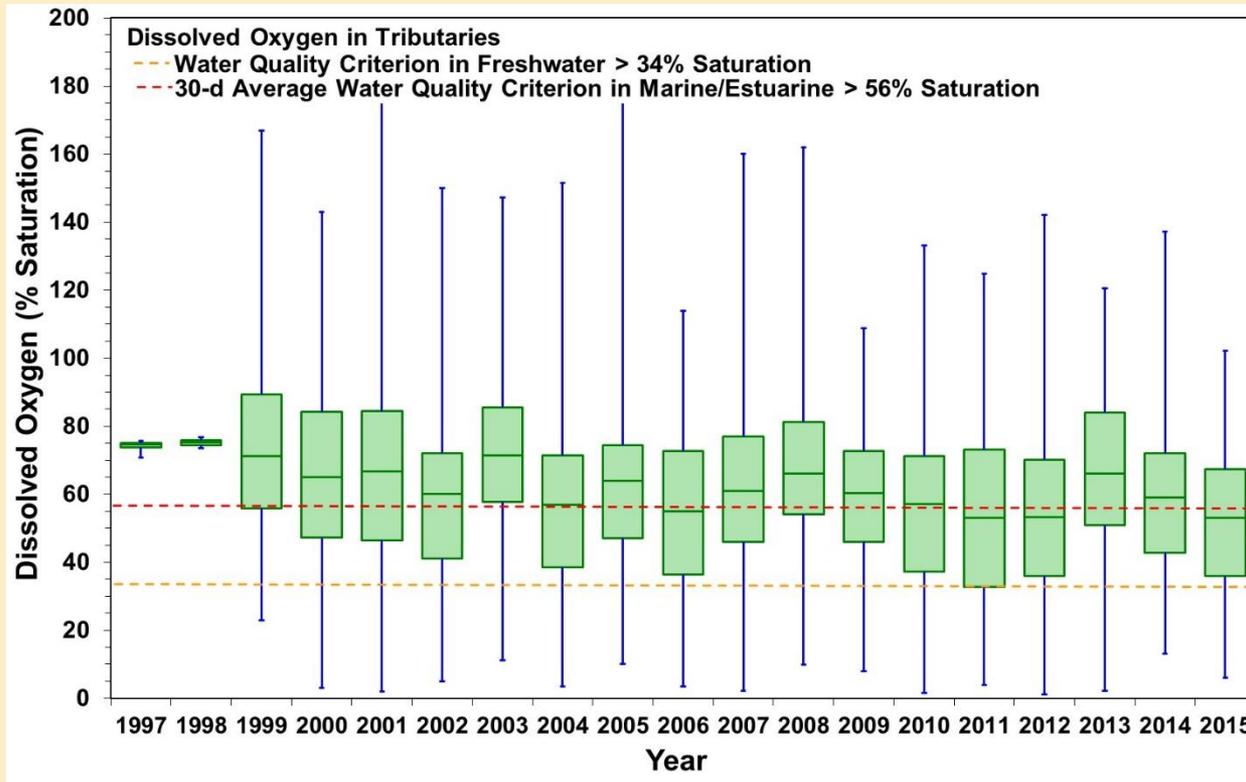


Marine/Estuarine



- Criterion change to percent saturation – values above line meet criterion. Mainstem medians exceed criteria in both freshwater and marine reaches.

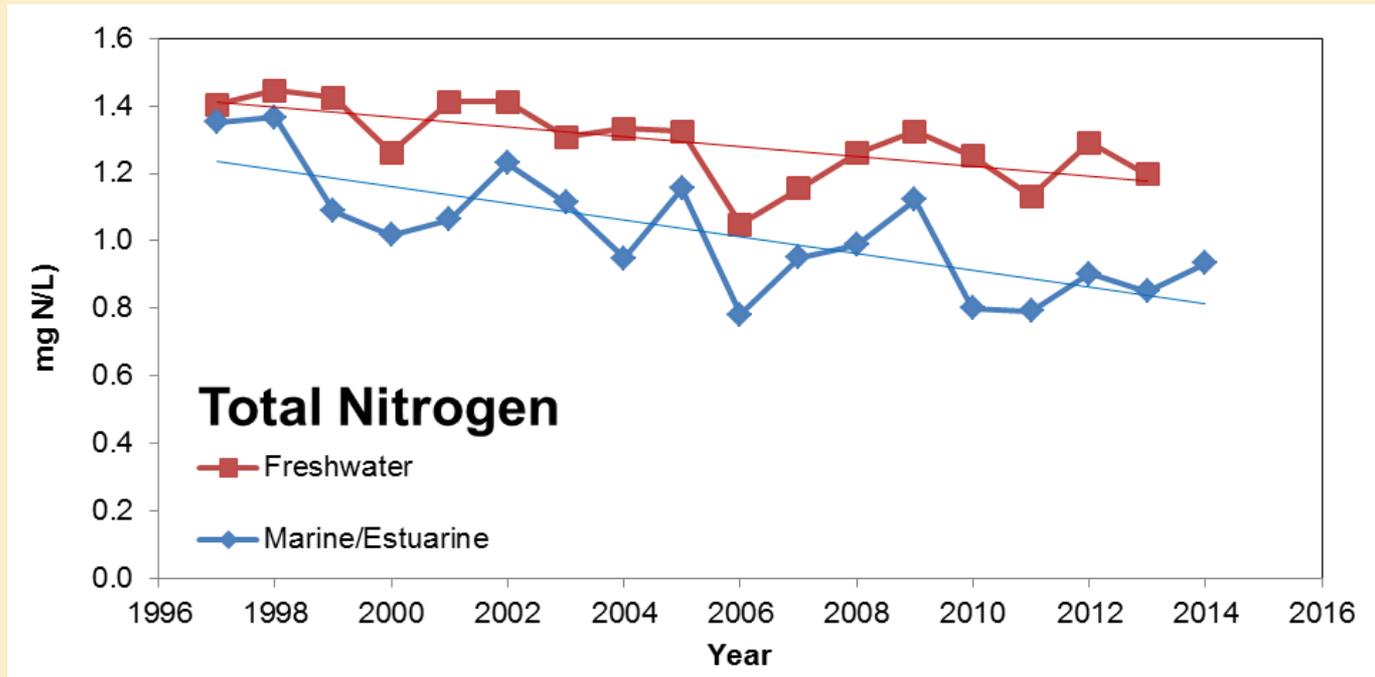
Dissolved Oxygen - Tributaries



- DO in tributaries is dependent upon location, time of day, and season.

Nutrients

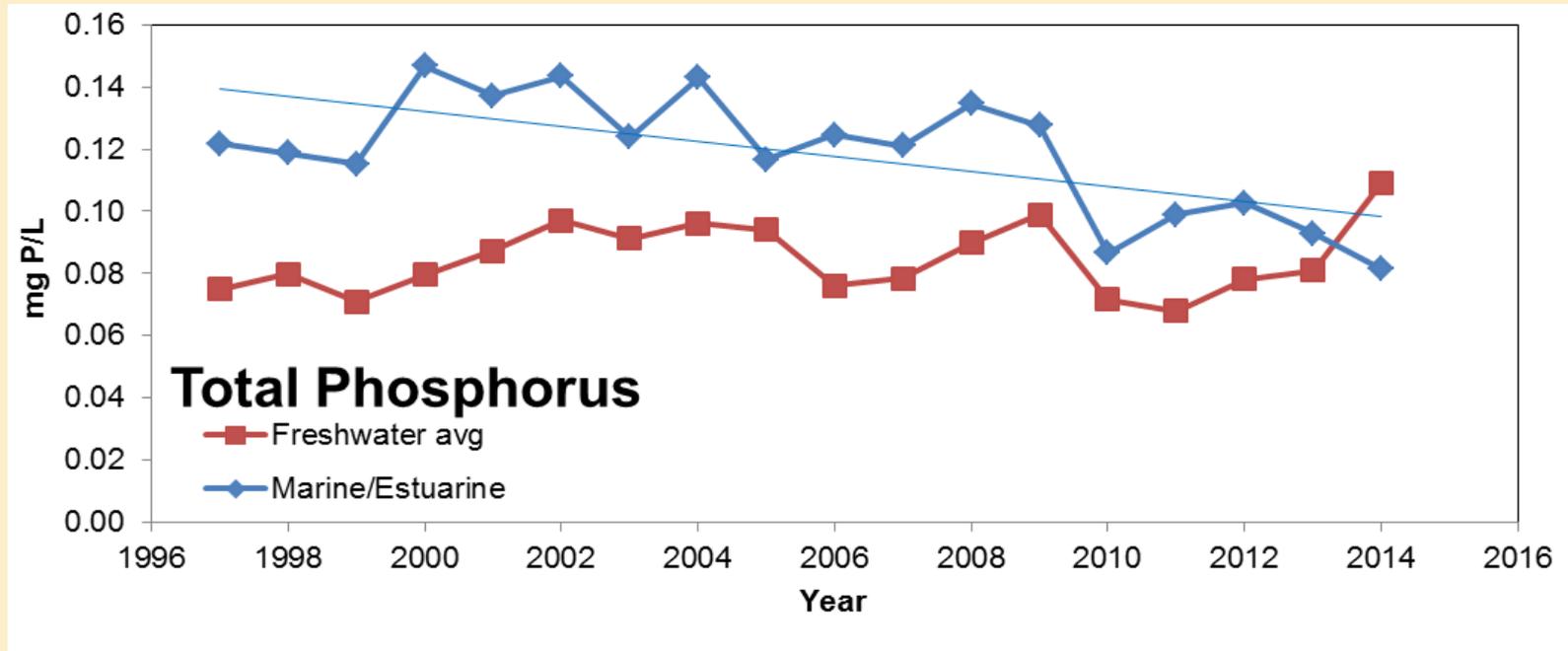
- Total Nitrogen Trend - Mainstem



- Annual average declining in fresh to marine water
(Spearman Rank $p < 0.05$)

Nutrients

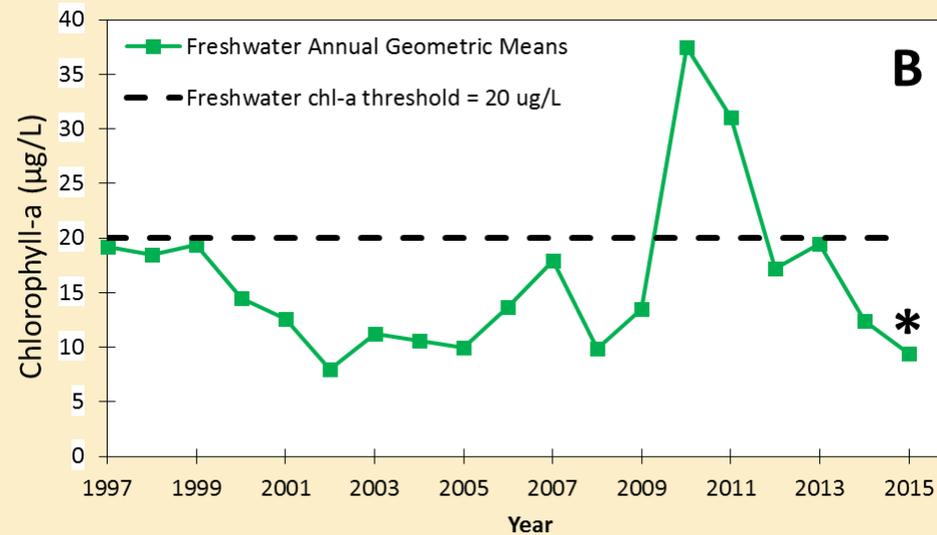
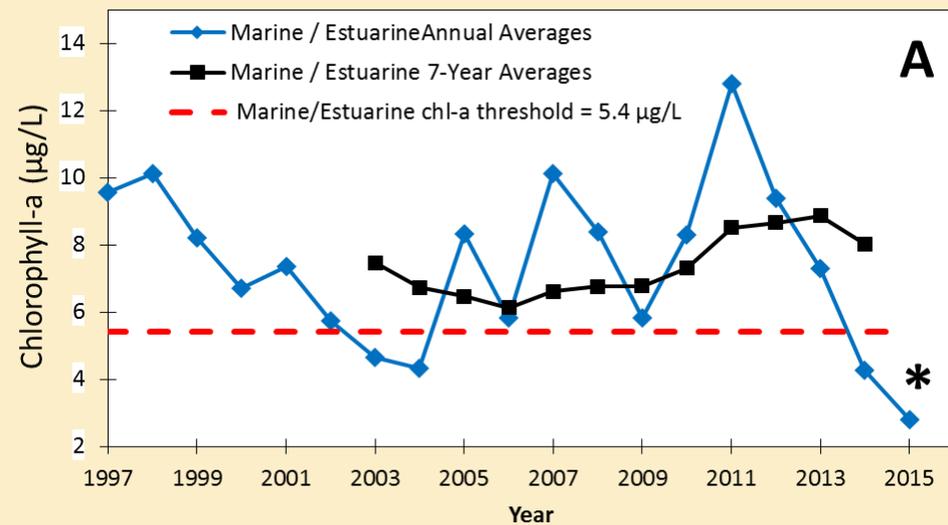
- Total Phosphorus Trend - Mainstem



- Annual TP averages decreasing in marine/estuarine, freshwater unchanged (*Spearman Rank* $p > 0.05$)

Chlorophyll-*a*

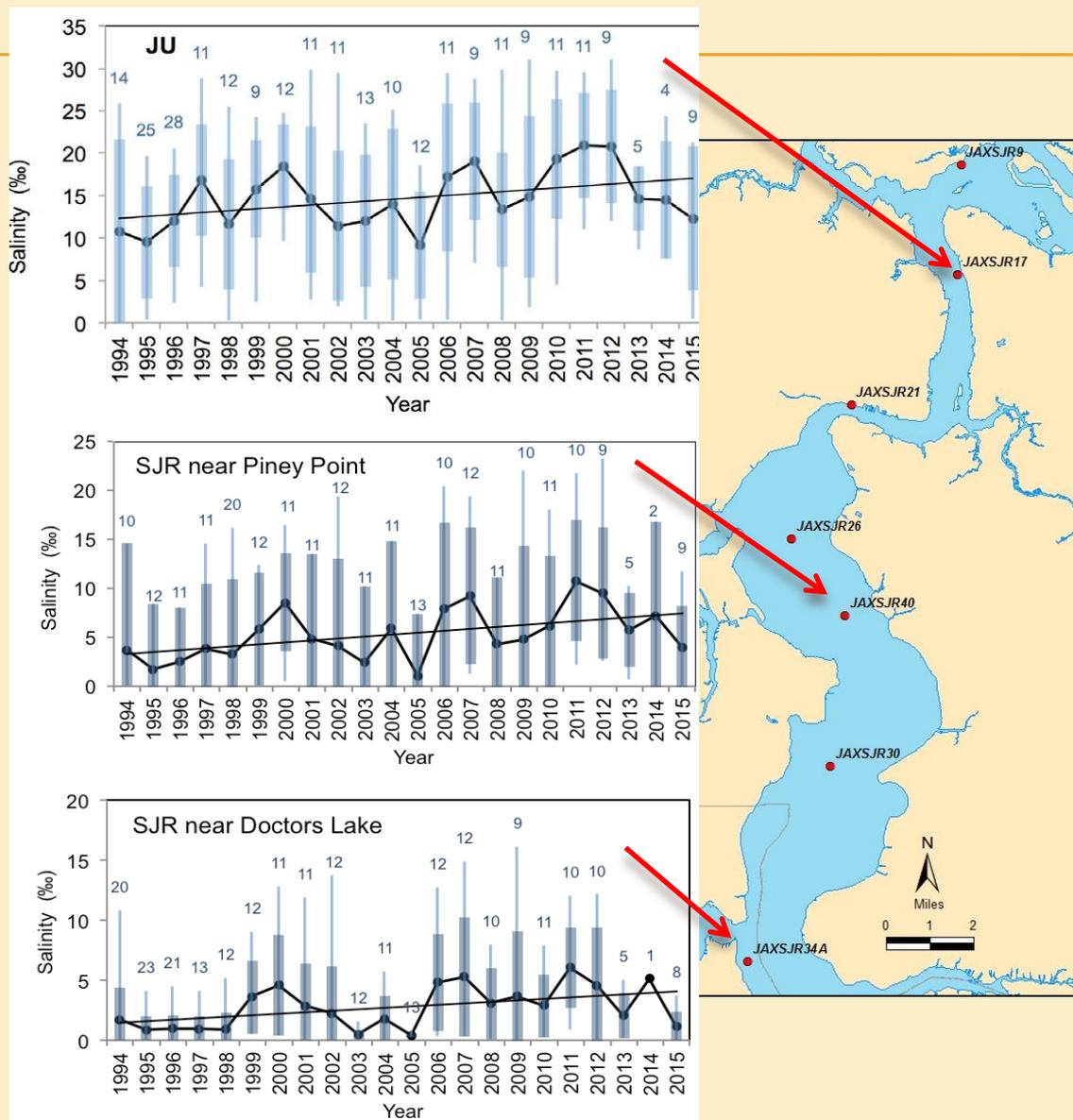
- Phytoplankton indicator used to assess blooms
- Pheophytin-corrected to indicate live organisms
- Trend



- Not all blooms are sampled, miss reported toxic events
- Better assessments needed

Salinity

- Fluctuations with weather
 - Drought
 - Hurricanes
- Daily fluctuations with tide up to Shands Bridge
- Increasing mean salinity

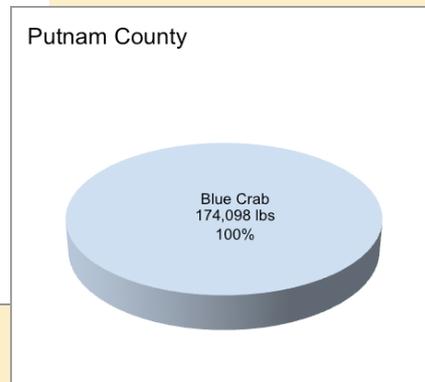
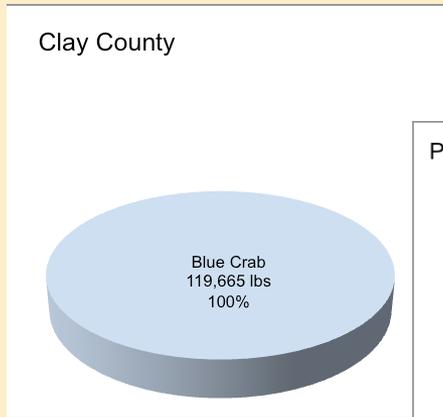
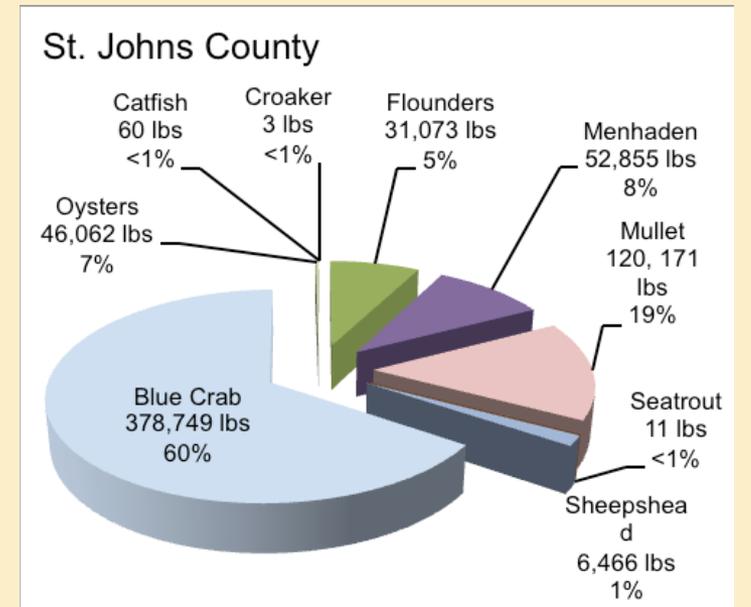
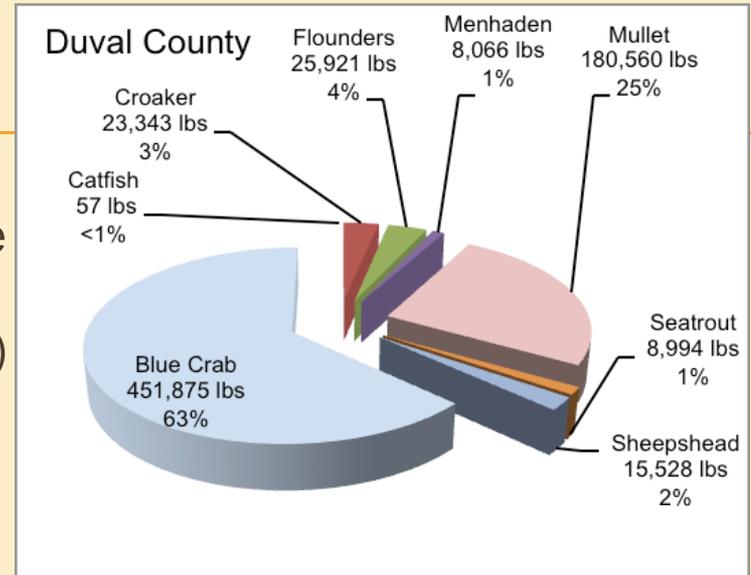


Salinity

- Potential impacts in the Lower Basin
 - Movement south of transition zones
 - Redistribution of salt and freshwater fish
 - Life-cycle disruption of organisms that need marine and freshwater habitats (e.g., crabs, shrimp)
 - Shifts in macroinvertebrate populations
 - Less SAV in the north
 - Less freshwater hardwood swamps in some areas

Fisheries

- Blue crabs ~70% (1,124,387 lbs) of the total landings in 2014.
- Commercial finfish ~30% (488,999 lbs)
- striped (black) mullet (19%)
- flounders and menhaden (3-4%)
- sheepshead, croakers, seatrout, and catfish (<1.4%).



Fisheries

 **RED DRUM**
Satisfactory status
Conditions unchanged

 **SPOTTED SEA TROUT**
Satisfactory status
Conditions unchanged

 **SHEEPSHEAD**
Satisfactory status
Conditions unchanged

 **ATLANTIC CROAKER**
Satisfactory status
Conditions unchanged

 **BAITFISH**
Satisfactory status
Conditions unchanged

 **STONE CRAB**
Satisfactory status
Conditions unchanged

 **LARGE MOUTH BASS**
Current status uncertain
Conditions unchanged

 **CHANNEL AND WHITE CATFISH**
Current status uncertain
Conditions worsening

 **SOUTHERN FLOUNDER**
Current status uncertain
Condition trend uncertain

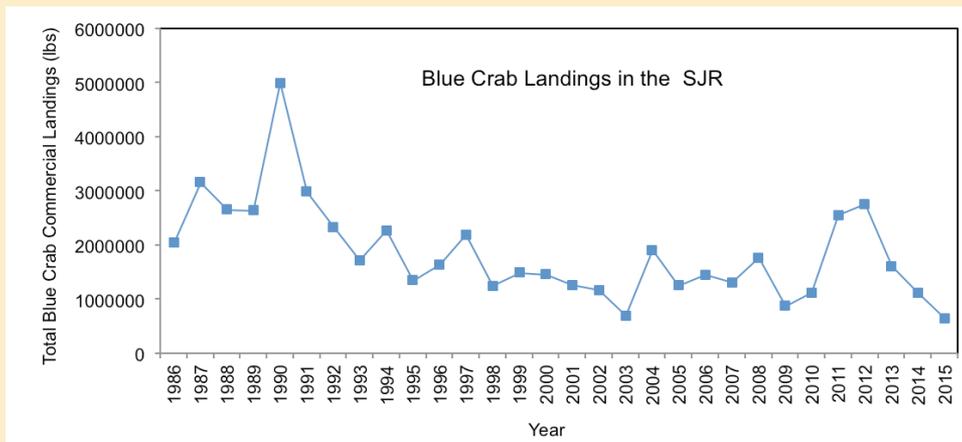
 **BLUE CRAB**
Current status uncertain
Condition trend uncertain

 **PENAEID SHRIMP**
Current status uncertain
Condition trend uncertain

- Most finfish and invertebrate species are not in danger of being overfished.
- Channel and White Catfish and white shrimp have the potential to be overfished in the near future.

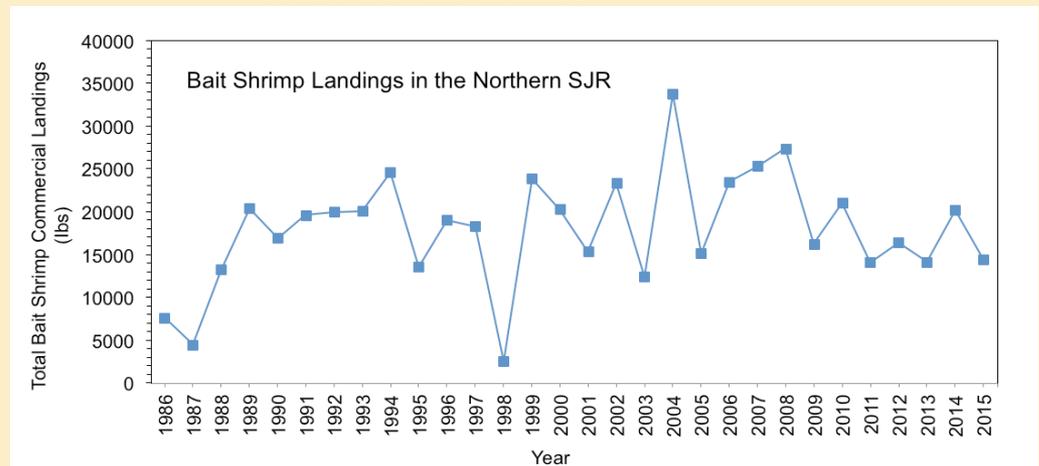
Blue Crabs

- Final Age ?
- No trend in the southern section where most crabs are caught
- Status Uncertain
- Trend Uncertain
- Male crabs can reproduce many times, females only mate once when mature and can store sperm for several months before actually spawning eggs.



White Shrimp

- Commercial data: no trend overall and high annual variability.
- Most shrimp caught in the northern part of the river, trend increasing.
- Southern section of the river trend decreasing.
- Increasing trend in Young of Year shrimp.
- Brown, pink, white shrimp.
- Season closed: April-May: Nassau, Duval, St. Johns, Putnam, Flagler, and Clay Counties.
- Smaller shrimp more north, less south.
- Larger shrimp north and south – brackish and salt water areas.
- Status Uncertain
- Trend Uncertain



Aquatic Life

Indicator	Status	Trends
Submerged Aquatic Vegetation	Unsatisfactory	Uncertain
Wetlands	Unsatisfactory	Uncertain
Macroinvertebrates	Uncertain	Uncertain
Threatened and Endangered Species	Satisfactory	Improving
Nonnative Aquatic Species	Unsatisfactory	Worsening

SAV

Tape grass
Vallisneria
americana



Water naiad
Najas
guadalupensis



Widgeon grass
Ruppia
maritima



Horned pondweed
Zannichellia
palustris



Awl-leaf arrowhead
Sagittaria
subulata



- **Significance**

- Nurseries
- Food
- Improves water quality
- Reduces erosion

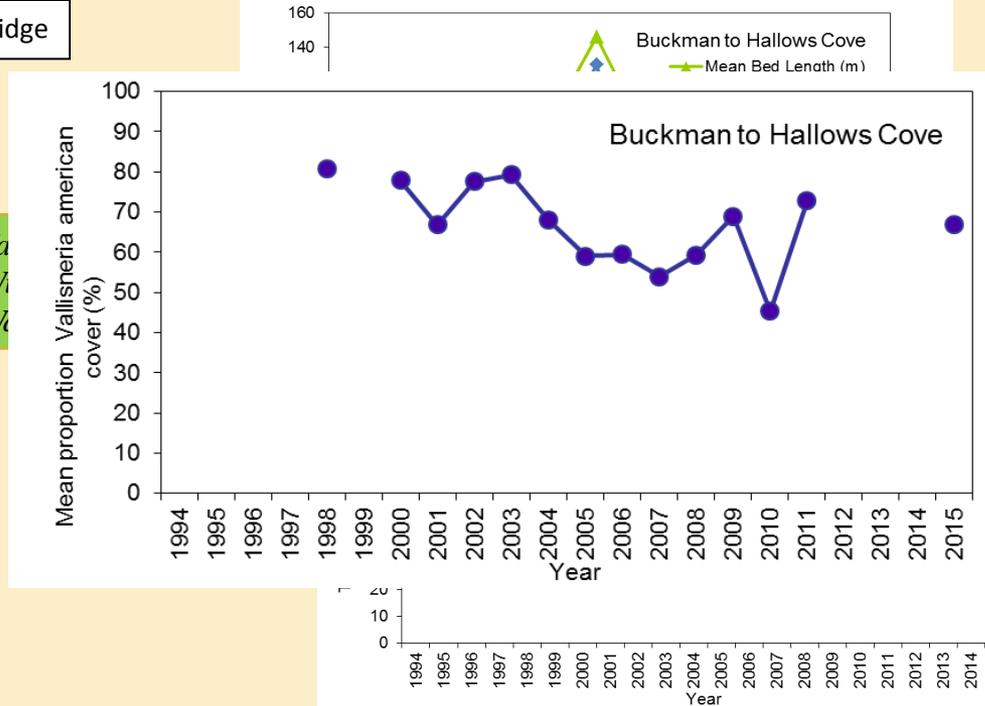
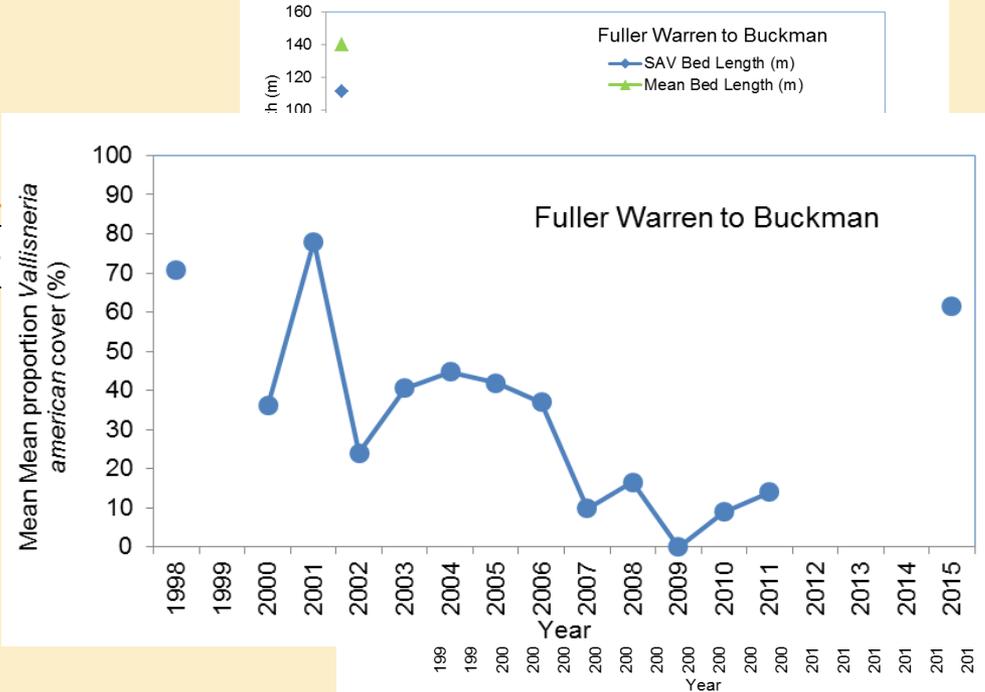
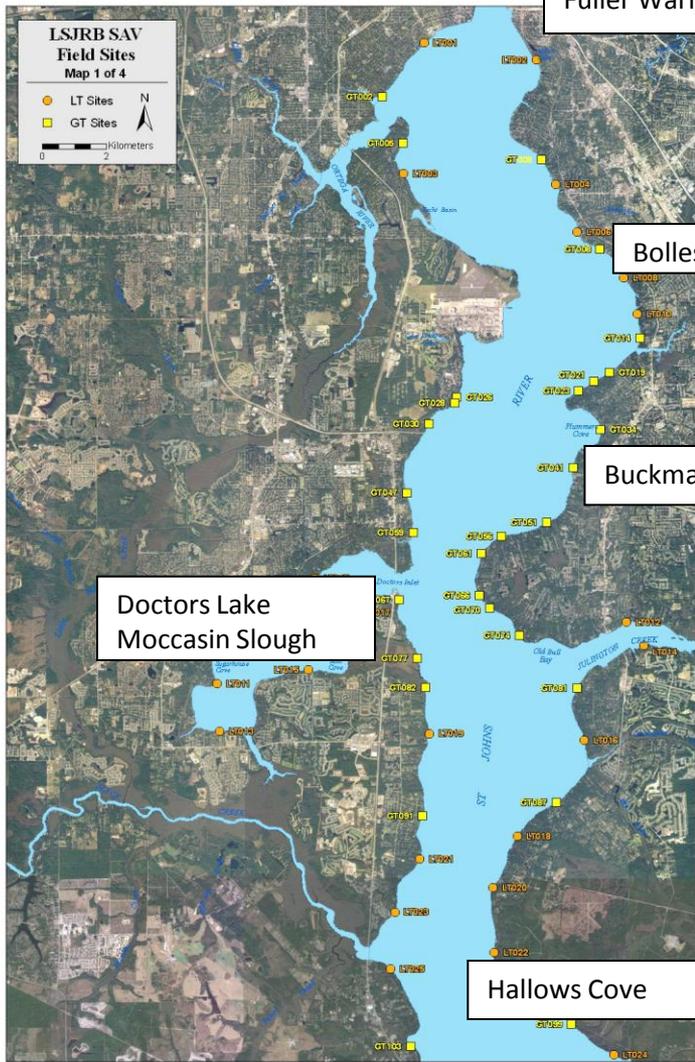
- **Critical Conditions**

- Salinity
- Water clarity
- Shoreline condition
- Epiphytes

- **Data**

- SJRWMD, 2000-2011 plus 2015.
- Transects in LSJR: 152 stations (2000-11) 40 stations (2015)
- Aerial observations 2008-2015

SAV



SAV

- Summary
 - Highly variable over time due to weather and other factors
 - Decline in grass bed coverage
 - End of monitoring in 2011 limits understanding of SAV dynamics at a critical time
 - Limited monitoring in 2015

INDICATOR	STATUS	TREND
Submerged Aquatic Vegetation	Unsatisfactory	Conditions worsening

Wetlands

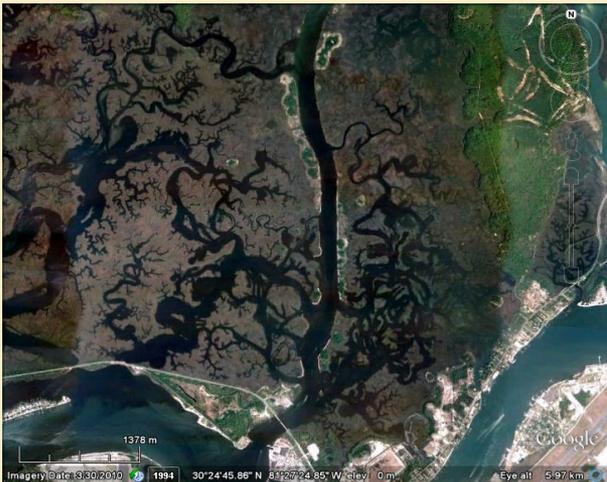
83% freshwater, ~44% freshwater forested.

- **Significance**

- Nurseries
- Habitat
- Food
- Improve water quality
- Stabilize banks
- Provide flood control

- **Stressors**

- Pollutants
- Sea Level Rise
- Hydrology changes
- Invasive Species
- Fragmentation



http://www.nwrc.usgs.gov/topics/invasive_species/index
<http://www.water.ncsu.edu>
Sjrwmd permitting site

Wetlands

- **Summary**

- Difficult to assess LSJRB wetlands status
- Concerns:
 - Shifts in wetlands types from mitigation and salinity changes
 - Loss of coastal wetlands
 - Loss of function by connectivity disruptions



Photos by Heather McCarthy

INDICATOR	STATUS	TREND
Wetlands	Unsatisfactory	Uncertain

Endangered & Threatened



- Numbers of manatees, bald eagles and wood stork greatest since 2000

(JU 2016, Audubon 2016)



Photo: Dave Menken, USFWS.



Photo by Wayne Lasch (PBS&J)



Chelsea Bohaty, JU MSRI

Contaminants

INDICATOR	STATUS	TREND
Chemical Releases (TRI)	Air – Satisfactory Water - Unsatisfactory	Air – Improving Water - Unchanged
Water Metals	Mixed	Conditions Unchanged
Sediments	Unsatisfactory	Conditions Unchanged

Contaminants

- **Metals in water:** *Arsenic, cadmium, copper, lead, nickel, silver, zinc*

Mainstem

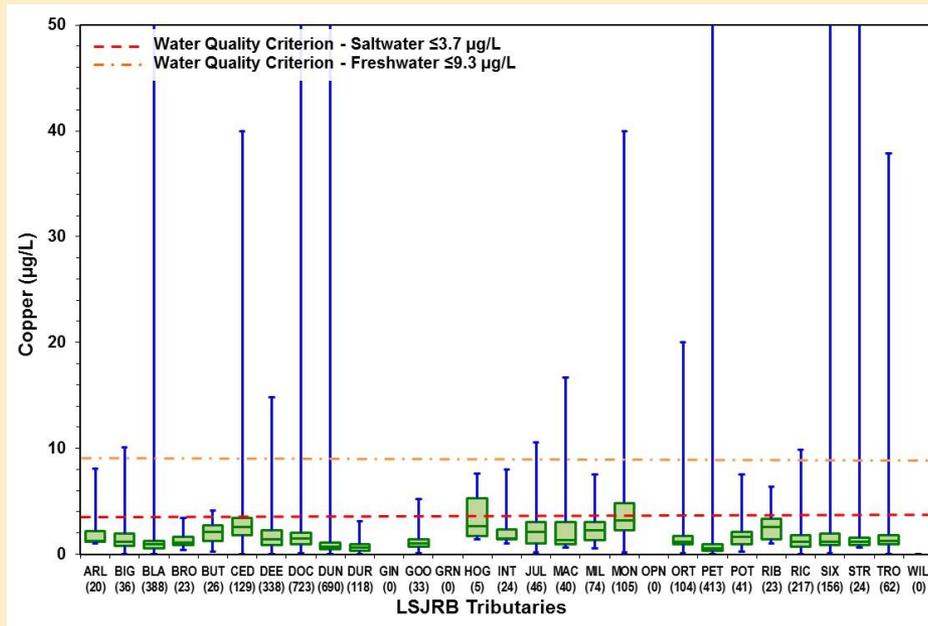
Maxima, medians down since 2009 for many

Most below WQC except copper in seawater, silver in freshwater

Tributaries

Copper biggest problem

Not enough data for trend analysis



Summary

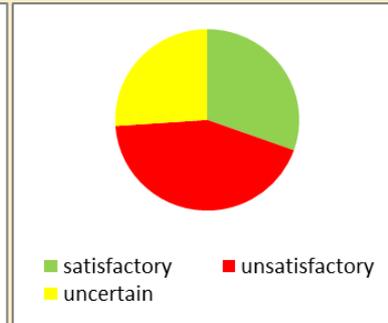
2013

2014

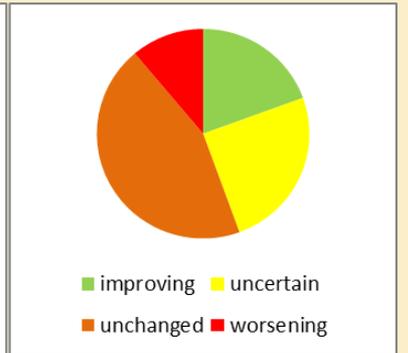
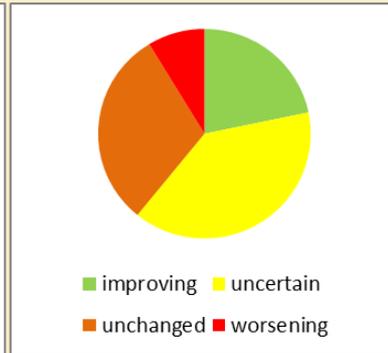
2015

2016

Status



Trends



- Status

- More unsatisfactory
- Less uncertainty
- Less/same satisfactory

- Trends

- More unchanged
- Less uncertain
- Some improvement
- Some worsening

ways you can help the St. Johns River



do not sweep leaves down storm drain



wash cars on lawn, not driveway



collect dog droppings



do not release exotic pets



limit use of weed killers and pesticides



- do not discard monofilament fishing line
- practice proper catch-and-release techniques
- use circle and corrodible fishing hooks



do not harm or harass protected species

reduce, reuse, recycle

limit footprint of docks and bulkheads

conserve energy



protect wetlands



conserve water

install a rain barrel



apply fertilizers responsibly



monitor & maintain septic tank and drainfield



- place garbage in proper receptacles
- discard hazardous materials (gas, oil, paint) at waste pick-up sites

By Heather McCarthy

Thank you! Questions?

Salinity



8720218 Mayport, Florida

2.50 +/- 0.27 mm/yr

